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14. ABSTRACT

The Valley Hospital of Ridgewood, New Jersey, is proposing to extend a limited but highly successful specimen management system. The system utilizes barcodes and handheld technology at the patient's bedside, to significantly reduce medical error by creating a positive identification system at the point of care. In addition The Valley Hospital looks to expand this success by implementing electronic medication administration and transfusion systems which function with the same technology as the specimen collection system

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INTRODUCTION

The program designed to reduce specimen collection, medication administration and transfusion errors at The Valley Hospital is rooted in utilization of bar-code technology in tandem with the use of handheld personal data terminals to create a positive identification system at the point of care. Presently, the specimen collection system is operational on 6 nursing units including the Emergency department. The bedside medication verification system is operating on 2 units and will provide the venue for the research in this study. The transfusion module is slated for a June 2006 implementation.

The purpose of this study (Phase II of the project) is to examine active errors to determine the contribution of human and technological factors and ascertain if latent errors have been inadvertently introduced. Active errors will be measured by observing staff performing specimen collection, medication administration, and blood transfusion administration. Rule-based procedures have been developed to teach the staff correct processes for implementing the new technology. The rule-based procedure is a check list that sequentially lists each step needed to safely and appropriately complete the procedures.

Data analysis will lead to changes in the rules or validate the rule-based procedures developed during Phase I of this project. Analysis of active error data will include human and technologic factors which can cause errors, resulting from using the proposed technology

Once piloted, revised, and validated, the rule-based procedures would serve as best practice models to reduce and/or eliminate medical errors, for the implementation of the electronic bar-coding system institution wide, for specimen collection, medication administration, and blood transfusion administration.

The aim of this study is to explore and understand latent and active errors that are generated from human interaction with technology processes. Validating the rule-based procedures will identify and eliminate the latent errors with the development of a standard of care that will maximize patient safety. Since practice patterns may have a wide variation depending on the specialty care unit, data will be collected using direct observation procedures and during ongoing team rounds as the technology is implemented on each unit. The goal of these continued observations and team rounds are to determine if one universal rule-based procedure is appropriate or if customization is needed to ensure proper implementation of the technology. Should customization be required, specific clinical procedures would be written. The level of customization would be carefully examined as lack of standardization is known to introduce errors for staff that work across many areas. The validated rule-based procedures will then function as protocols for use when the institution wide implementation of the electronic bar-coding system is completed for specimen collection, medication administration, and blood transfusion administration

Body of Work

A review of the work accomplished during the period of performance between 12 April 2006 and 11 April 2007 is described in this document. A review of the work accomplished during the period of performance between 12 April 2006 and 11 April 2007 is described in this document. The implementation of the specimen collection system was completed in the fourth quarter of 2006. During this period of performance the Critical Care units went live with the system. Fifty one users have been consented and observed. Preliminary results have not revealed any best practice derived from user scenario variations. The dominant users are the patient care associates they are observed to follow the user scenario most closely. Observation of the registered nurse reveals an increased variation from the user scenario. The observational data is presently being analyzed and a retraining course will be determined.

The bedside medication system has been implemented on three additional patient care units since the last annual report. The Neurology and Orthopedic units went live on 5 Sept 2006 followed by the Emergency Department on 3 Mar 2007. In the technical development stage of the project it was revealed that the Meditech software did not support pocket pc. The alternative technology choice was laptops with tethered bar-code scanners on carts, otherwise known as, computer on wheels (COWs). This is the present hardware configuration being used in a wireless environment for bedside medication administration.

With five patient care units live on the system it has become evident that there has been a significant workload and workflow impact on the pharmacy. Due to this, it has been decided to halt further implementation of patient care units until the pharmacy staffing can be configured to meet the workflow change demand. The research team is busy obtaining informed consents and conducting observations on the 5 units. To date 109 users have been consented and observed. The data is presently being analyzed for any newly found potential for best practice. Conversely, the data is being analyzed for introduction of new portals for latent error. A program for additional training will be determined.

The Meditech transfusion software was received and reviewed. Upon analysis of the process flow sheets developed by the research team brought to light immaturities in the software and caused us to request significant enhancements to its functionality. The vendor is currently in the process of making the system changes. We anticipate a delivery of these enhancements sometime in the second quarter of 2007.

The American Academy of Blood Bank has mandated the use of ISBT-128 barcodes be used to identify blood products with a deadline of 1 Aug 2007... During this quarter, the ISBT 128 barcode software and hardware was received. Testing of this product along with the development of a process for implementation was established. Dictionaries are presently being built and validated to accurately print and track the ISBT 128 barcode.

KEY RESEARCH ACCOMPLISHMENTS

Technical Components

- **Specimen Collection System**
- Hardware assessment and placement in the 4 Critical Care Units (ICI,CCU,IMC,CS2)
- Cisco System wireless backbone installed in the 4 Critical Care Units (ICI,CCU,IMC,CS2)
- Training program for the staff of the 4 Critical Care Units (ICI, CCU, IMC, CS2).
- Implementation of the specimen collection system in the 4 Critical Care Units (ICI, CCU, IMC, CS2) using the wireless configuration.
- **Beside Medication Verification System**
- Wireless devices installed and tested on 3 additional patient care units.
- Implementation on 3 additional patient care units. 5 Sept 06 on 2 patient care service units (Neurology and Orthopedics) and 01 Mar 07 in the Emergency dept.

Training Program

Specimen Collection System

- 136 RNs have been trained to use the system in the Critical Care units
- 45 Patient Care Associates have been trained to use the system in the Critical Care units.
- 10 Business Associates have been trained to use the system in the Critical Care units.
- **Bedside Medication Verification System**
- 180 RNs have been trained to use the system in the Emergency, Neurology and Orthopedic Depts.

Informed Consent

- The Informed Consent went before the IRB and was accepted for renewal on 12/28/06.
- 51 users have been consented and observed using the Specimen Collection System.
- To date109 users have been consented and observed using the Bedside Medication Verification System

Transfusion Administration System

- Analysis and testing of software revealed system immaturities that rendered the system unfit for go-live.
- Waiting for commitment on Software upgrade delivery.
- Software testing for BTS128 bar-coding is being conducted. Committed deadline is 1 Aug 07.